

**Bonneville Power Administration
Fish and Wildlife FWP FY99 Proposal**

Section 1. General administrative information

Second-Tier Database For Ecosystem Focus

Bonneville project number, if an ongoing project 9601900

Business name of agency, institution or organization requesting funding
Bonneville Power Administration

Business acronym (if appropriate) BPA-EWI

Proposal contact person or principal investigator:

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Subcontractors. Organization	Mailing Address	City, ST Zip	Contact Name
Columbia Basin Research, University of Washington		Seattle, WA	Dr. James Anderson
Fish Passage Center		Portland, OR	Ms. Michele DeHart
StreamNet [Pacific States Marine Fisheries Commission]		Gladstone, OR	Mr. Randy Fisher

NPPC FWP Measure Number(s) which this project addresses. Refer to 1994 Fish and Wildlife FWP as amended in 1995; NPPC staff will proof this field and correct if necessary; separate multiple measure numbers with commas.
3.2G, 5.0F.4

NMFS Biological Opinion Number(s) which this project addresses.

Other planning document references.

Subbasin.

Columbia, Snake, Clearwater, Salmon

Short description.

Provide single-point, Internet-based access to a subset of fishery, hydraulic, project-operation, and environmental information useful in monitoring and evaluating regional efforts to recover threatened or listed anadromous species.

Section 2. Key words

Mark	FWPmatic Categories	Mark	Activities	Mark	Project Types
X	Anadromous fish		Construction		Watershed
	Resident fish	+	O & M		Biodiversity/genetics
	Wildlife		Production		Population dynamics
+	Oceans/estuaries		Research		Ecosystems
+	Climate	X	Monitoring/eval.	X	Flow/survival
	Other		Resource mgmt		Fish disease
			Planning/admin.		Supplementation
			Enforcement		Wildlife habitat en-
			Acquisitions		hancement/restoration

Other keywords.

information-infrastructure

Section 3. Relationships to other Bonneville projects

Project #	Project title/description	Nature of relationship
9105100	Monitoring and Evaluation Statistical Support [UW]	Critical - 9105100's "RealTime" statistical juvenile salmon migration timing models require input presently only available from 9601900 services. Models are used during migration season in support of weekly hydrosystem operations.
8910700	Statistical Support for Salmonid Survival Studies [UW]	Critical - 9601900 integrates regionally-distributed data sets for

		input to 8910700 survival analyses.
8910800	Monitoring and Evaluation Modeling Support [UW]	Critical - 8910800's CRISP juvenile salmon hydrosystem survival model requires input presently available only through 9601900 services. Model is used during migration season in support of weekly hydrosystem operations.
940330	Fish Passage Center [FPC]	Critical - FPC provides passage indices, transport numbers, and hatchery release data to be integrated into second-tier database
9008000	Columbia Basin PIT-tag Information System [PSMFC]	Critical - PSMFC provides PIT-tag tagging and detection information to be integrated into second-tier database
9207104	In-season Operations Technical Management Team (TMT) Support-Corps funded.	Critical - 9601900 integrates primary data from Corps of Engineers, PSMFC, and FPC for retrieval, processing, and presentation to TMT to support weekly hydro-operation decision. 9207104 prototyped Internet TMT support systems now used by Corps.
8810804	StreamNet (aka CIS)	StreamNet is the FWP data archive which could (but does not) provide the integration of historical and inseason observations provided by this proposal.

Section 4. Objectives, tasks and schedules

Objectives and tasks

Obj 1,2,3	Objective	Task a,b,c	Task
1	Assemble and serve (via the Internet) input data sets to FWP-funded and ESA-mandated modeling, monitoring, and evaluating efforts whose input requirements are not satisfied by a single primary data service.	a	Identify qualifying projects and their input data requirements. Task will be annual and performed through coordination with responsible regional entities.
1		b	Implement data polling, quality

			control, posting, and reporting of input data to recipients.
1		c	Revise processes on mutually-agreed timeframes to satisfy evolution of models, refinement of user needs, and of Internet services.
2	Provide monitoring and evaluation information (via the Internet) on single and associated FWP-funded and ESA-mandated activities	a	Identify single and associated projects appropriate for second-tier monitoring and evaluation. Task will be annual and performed through coordination with regional entities.
1		b	Implement data polling, quality control, posting, and reporting in cooperation with project participants.
			Revise processes on mutually-agreed timeframes to satisfy refinement of needs and evolution of Internet services.
3	Provide a public Internet interface to the integrated data that permits interactive selection of data items, time frame, presentation format, etc.		

Objective schedules and costs

Objective #	Start Date mm/yyyy	End Date mm/yyyy	Cost %
1	10/1998	9/1999	60.00%
2	10/1998	9/1999	30.00%
3	1/1998	9/1999	10.00%
			TOTAL 100.00%

Schedule constraints.

4/1/1999 - All services of Objectives 1 and 3 to be functional to serve information during juvenile outmigration

Completion date.

2002

Section 5. Budget

FY99 budget by line item

Item	Note	FY99
Personnel	12 month salary for database administrator and coordinator/web programmer.	\$90,000
Fringe benefits	If this is a "value-added" service to entity with database admin, subtract 6-month salary (\$26,000)	\$21,000
Supplies, materials, non-expendable property	T1 telecommunications line rental. If already available, subtract \$12,000.	\$13,000
Operations & maintenance	Assume 80% of total is "O&M"	
Capital acquisitions or improvements (e.g. land, buildings, major equip.)	If this is "value-added" service using existing computer resources, subtract \$40,000.	\$40,000
PIT tags	# of tags:	
Travel		\$1,000
Indirect costs	26% of direct cost minus student fees, equipment, office lease	\$30,000
Subcontracts		
Other		
TOTAL		\$195,000

Outyear costs

Outyear costs	FY2000	FY01	FY02	FY03
Total budget	\$198,000	\$198,000	\$198,000	\$198,00
O&M as % of total	80.00%	80.00%	80.00%	80.00%

Section 6. Abstract

The Fish and Wildlife Program (FWP) repeatedly cites the need to use the "best available information" and "adaptive management" in recovery efforts based upon effective monitoring and evaluation. The Corps of Engineers, Fish Passage Center, StreamNet, and other primary data centers separately provide a variety of high-quality fishery, hydraulic, project-operation, and other data but the integration of that information into useful products is essential for effective monitoring and evaluation. Lack of co-location and a diversity of data access protocols and data formats complicates and increases the costs of data integration needed by many efforts funded by the FWP or required under ESA.

This project continues to improve the integration and delivery of such information to FWP participants and the greater Public. Using internet-based technology proven since

1995, the separate primary providers are polled automatically and subsets of their data integrated into this contract's local database. Specific data extracts and reports are then automatically generated for identified FWP and other customers, saving them time and expense. Data exchange agreements between the involved parties will assure timeliness and content.

This project also provides an intuitive and highly flexible Internet-based interface for public access to the integrated database. This service will, at a minimum, provide the present flexibility of user-customized graphic or tabular reports of multiple parameters over multiple years. Such user-defined services encourage adaptive management by encouraging the user to ask "What if..." and then explore what available information has to say.

Section 7. Project description

a. Technical and/or scientific background.

The FWP repeatedly cites the need to use the "best available information" and "adaptive management" of recovery efforts based upon effective monitoring and evaluation. The availability and quality of information effectively determine the potential for effective monitoring, evaluation, and adaptive management of recovery efforts. Prior to the advent of the World Wide Web (Internet), ca. 1995, citizens or FWP participants needing information from the primary regional information storehouses (StreamNet, Fish Passage Center, Corps of Engineers) faced substantial "soft costs" associated with determining that data of interest actually existed and the time delays in obtaining and integrating essential information obtained from different providers. In practice, what was "best" and "available" was reduced to what was practical, possible, and affordable.

StreamNet (aka CIS, the Coordinated Information System) is identified by the FWP as the archive or regional database for FWP information and the Fish Passage Center (FPC) is responsible for the design [and execution] of the inseason smolt monitoring program. Other federal, state, and tribal resources provide separate, mission or topic-specific information.

With the advent of the Internet and the Presidential National Information Infrastructure Initiative (NIII), the measures of "available" and "best" have been redefined with an expectation of improvement in derivatives such as monitoring, evaluation, and adaptive management. Despite improvements in data quality and access provided by the FPC, StreamNet, and other regional primary data, the FWP still lacks:

1. A clearly-defined means by which regionally-distributed (online) information can cost-efficiently be integrated for participants, and
2. A clearly-identified means of integrating critical portions of such online information into products useful to monitoring, evaluation, and adaptive management.

Since 1995, this project (as part of BPA Project 8910800 - Columbia River Salmon Passage Model, CRiSP) and BPA Project 9207104 (Network-Based World-Wide Web Information Infrastructure [now operated by the Corps of Engineers for the Technical Management Team]) have been BPA's prototype solutions to the above needs. This project has provided a unique single-point source for FWP participants needing integrated information from more than one primary data provider, reducing participant "soft costs" associated with information acquisition and increasing FWP cost effectiveness. Project 9207104 continues to provide "third tier" services that only integrates regional information for management analysis and support of operational decisions.

These prototypes have been underwritten by BPA as part of its responsibilities under the NIII as BPA exercises its responsibilities under the Endangered Species Act and Power Act. This proposal provides for the formal adoption of these prototype solutions into the FWP.

b. Proposal objectives.

1. Provides effective mechanism integrating regionally-distributed online information into monitoring and evaluation products supporting adaptive management of recovery efforts.
2. Provide data extracts from these same geographically-distributed databases as coordinated with FWP participants to reduce "soft costs" of individual project data acquisition and processing.
3. Provide single-point Internet-based interactive and user-customized graphic and tabular reports of current and historic fishery, hydrographic, project-operation, etc. information from geographically-distributed databases supporting the FWP and ESA actions funded by BPA.

c. Rationale and significance to Regional FWPs.

The FWP repeatedly cites the need to use the "best available information" in recovery efforts. In practice, and until the recent explosion of Internet use, this information standard was handicapped by limited public awareness of what data was available and how to obtain it, by the limited amount of relevant data actually online, and by "soft costs" associated with time delays in obtaining and integrating information from different providers. What was "best" and "available" was reduced to what was practical, possible, and affordable. With the National Information Infrastructure Initiative (NIII), federal standards of "availability" have increased, requiring improvements in regional information management, including FWP information. This proposal continues the development and demonstration of certain improvements.

The FWP identifies StreamNet (aka CIS, the Coordinated Information System) as the archive or regional database for FWP information. The StreamNet Steering Committee,

comprised of federal, state, and tribal representatives, has directed the development of that archive which, until recently, has provided very limited amounts of information online. The FWP also identifies the Fish Passage Center (FPC) as responsible for the design of the inseason smolt monitoring FWP. The FPC, over time, has also assumed the role of inseason data manager and archive, including information from the Corps of Engineers. FPC provides a large amount of online quantitative information pertinent to inriver research and decisions affecting operation of the hydrosystem. However, the “paper image” format of such reports perpetuates the “soft costs” of information reformatting. And, in the time-honored tradition, individual researchers and the various federal, state, and tribal participants continue to maintain their own local mission- or topic-specific information “archives”. Consequently, the Public citizen or FWP participant needing information provided by these entities continues to face substantial “soft costs”.

Improvements in information infrastructure have been impeded by a lack of coordination between StreamNet and FPC, by the lack of data archive standards, and by funding limitations under the Memorandum of Agreement (MOA). The advent of the National Internet Information Initiative in 1995 encouraged federal agencies to improve public access to information generated using public funds or pertinent to federal decisions. Despite substantial initial resistance, at least rudimentary Internet services are presently being provided by FWP data managers

The FWP also repeatedly cites the need for effective monitoring and evaluation to support adaptive management of recovery efforts. Unfortunately, there is little or no framework that defines what these requirements are or how they are to be implemented. This proposal provides a medium (the Internet) and a mechanism by which available online information can be integrated into sound monitoring and reporting products for adaptive management of recovery efforts. BPA’s Projects 8910800 (UW Web services) and 9207104 (currently the Corps of Engineer’s Technical Management Team Web Page) are prototypes in which diverse and regionally-distributed hydraulic, fishery, operational, and administrative information is integrated to provide interactive and automatically-prepared measures of performance, means of comparison and evaluation, and records of consequent management actions. Analogous online systems can be developed cooperatively between interested participants under Council direction with consequent development of a sound monitoring and evaluation infrastructure.

d. Project history

During 1995, use of the Internet in support of Technical Management Team (TMT) information management was tested and demonstrated as part of UW’s BPA Project 8910800 (CRiSP) and Battelle’s Pacific Northwest Laboratory’s BPA Project 9207104 (Network-Based World-Wide Web Information Infrastructure). A prototype system involving regionally-distributed data and data servers was connected via the Internet to act as a single “virtual” information resource for anyone having a microcomputer connected to the Web. The University of Washington, in an interim basis, physically

collected information from regionally-distributed databases (FPC, Corps, BPA, PITAGIS, USGS, etc.) into a single second-tier database with which to demonstrate Web-based query and viewing tools. This “duplication” of regional data both facilitated testing of products and avoided impacts to the regionally-distributed databases and support staff.

The second-tier site: (<http://www.cqs.washington.edu>)

- provides access to complete year-to-date time series previously available only in single-day or several-day moving windows at primary sites,
- permits simple, quick access to cross-tabulations and graphics combining information presently distributed regionally on separate databases,
- reduces Web-based and other user impacts on primary sites whose resources are dedicated to data collection and quality control.

The UW services include a dynamic database that automatically queries regional databases for current (daily) information and provides both automatically- and interactively-prepared tabular and graphical reports merging hydraulic, environmental, fishery, and other data. Certain products were used by other projects, including 9105100 and 9207104, as source material for models forecasting the migration pattern of wild PIT-tagged spring chinook juveniles and other “value-added” displays. The resulting web of information remains online and can be accessed as reference material for future years and as material for evaluation of the effectiveness of the TMT.

The Battelle project demonstrated the utility of a “third-tier” data service, one devoted purely to “value-added” integration and presentation of information available elsewhere on the Internet. This project demonstrated how quality online data could be integrated into highly-informative, condensed, graphical presentations or reports with minimal human effort. A plethora of products are regenerated nightly with only an hour a week or less of system administration checking for data problems. The products of this effort are available for examination at:

<http://www.nwd-wc.usace.army.mil/TMT/>

Of particular relevance to FWP participants are the Report Generator function and the Proposal Tool. The Report Generator allows a user to select one or more routinely-prepared documents, graph, ect. for viewing and, perhaps printing, as a single package. The separate items can be reside anywhere on the Internet. Such a tool can be used to integrate information within a single project or to provide integration of documents at any level of FWP administration, including the assembly of documents for upcoming meetings by the Council or any contract coordination. The Proposal Tool employs a form-based interface that allows users to enter proposals and comments in an online discussion of issues. Employment of such a tool could provide an exchange of views, information, and ideas throughout the region, and certainly prior to meeting addressing issues of regional interest. Again, this tool could be implemented on a project or any higher administrative or technical level where interactive dialog is desired. Both tools improve access, review, monitoring, and evaluation.

It was anticipated that some or all of the prototyped services would be adopted by one or more of the responsible primary data servers in the implementation phase of Internet-based TMT services. To date, only the Corps of Engineers has taken such action, having adopted in 1997 the entire services provided under the now-defunct project 9207104. Currently, the Corps of Engineers TMT service (<http://www.nwd-wc.usace.army.mil/TMT/>) relies heavily on project 9601900 second-tier services for integrated data.

This project promotes adaptive management by making available information essential to sound decisions. It provides immediate regional-wide access to current and historical information essential to sound recommendations for the operation of the Federal Columbia-Snake hydrosystem. Automatically and interactively-prepared queries allow the synthesis of graphical and tabular products that formerly would not have been possible because of geographic separation of information resources. The Internet and its services allow FWP participants, administrators, and support staff to be distributed regionally while assuring communication of information as a single, connected, workgroup.

Historical costs of the combined prototype projects are as follows.

UW's BPA Project 8910800 (CRiSP)

1995: \$80,000

1996: \$50,000

1997: \$60,000

Battelle's Pacific Northwest Laboratory's BPA Project 9207104 (Network-Based World-Wide Web Information Infrastructure)

1995: \$50,000

1996: \$85,000

e. Methods.

To continue existing services, the provider will need to wholly adopt and support a computer and database system functionally equal to the UW/Battelle system. Migration of the service to a new environment would require funds beyond this proposal. In short, the required system includes the Unix operating system; various common "open-system" software tools, and database services equal to the current version of the Ingres database management system.

This specification is necessary since the "essential organs" of these prototypes are comprised of (typically) open-system software tools that are not available under other operating regimes. For example, the automated data polling process is set in motion at specified times (when Internet traffic is low) by the Unix cron demon. Cron is a software tool that uses the computer's internal clock to schedule FWP execution according to a user-controlled scheduling plan (the cron table). The update process itself is

implemented using shell scripts and makefiles. Make is a Unix-based utility that checks dependencies of specified files, and executes commands to update any files that are determined to be out-of-date. A command-line web browser (i.e. a non-interactive WWW access tool) is used to automatically download specified datafiles from the provider. If the downloaded datafiles contain new data (as determined from the dependencies in the makefile), a series of Perl and Unix shell scripts are executed to process the data into the local database and into graphical or tabular products and moved to the Web server directory tree for public viewing.

Tasks 1a and 2a will require the endorsement of the Council and the identification of projects that can benefit from second-tier data integration services.

Tasks 1b and 2b will not proceed without a mutually-agreed-to data exchange standard that defines the frequency, contents, format, etc. of services provided to FWP participants. That agreement may be modified through experience as data services are delivered under Tasks 1c and 2c. Responsiveness of the service to revision requests is a principle issue to be addressed in the data exchange standard.

Task 3 will be accomplished in accordance to objectives of the National Internet Information Initiative

f. Facilities and equipment.

The current UW computer and database system is comprised of SUN UNIX workstations, including a 20 gigabyte online storage capacity and a T1 communication line for ethernet access to the Internet. IBM-compatible personal computers are also used for development and testing of Web products.

g. References.

Scheibe, Tim et al. 1998 (Draft) Development of a Network-Based Information Infrastructure for Fisheries and Hydropower Information in the Columbia River Basin. Final Report to BPA for Project 92-071, Contract WA179-86BP62611 - Task 24. Pacific Northwest National Laboratory. May 1997 Final Draft.

Section 8. Relationships to other projects

The relationship between the primary databases (FPC, StreamNet, Corps) and this secondary site is an artifact of regional information politics and of the still rudimentary nature of information technology. As the telecommunications infrastructure and software mature, the separateness of primary data services may become less of an obstacle to end users and the need for second tier data services may decrease.

Whether information politics will mature is a hoped-for consequence of the National Internet Information Initiative. At times, the second-tier services have been criticized as

duplicating or competing with primary provider services. At the June 3, 1997, Northwest Power Planning Council (Council) meeting a question was raised about possible redundancy of the University of Washington's database FWP called Data Access in Real Time (DART) and the analysis on the Fish Passage Center's (FPC) Web pages. The University of Washington (UW) has prepared and provided the Council with a direct comparison of the several systems that constitute the region's information infrastructure for anadromous fish. The DART Web page may be accessed at <http://www.cqs.washington.edu/dart/dart.html>.

The FPC web page is located at <http://www.teleport.com/~fpc/index.shtml>.

This comparison illustrates the function of "second-tier" data management services--synthesis and addition of value. Primary data managers (FPC, Corps, PTAGIS) have traditionally focused on raw data collection, processing, and presentation in selected formats to cooperating entities. Integration with data from other primary providers is generally left to the user. The second-tier service increases the value of the several primary services by providing a single consistent interface to both primary data (hence the appearance of duplication) and to integrated products that convey more information collectively than separately.

While it is BPA's opinion that the second-tier provider is an essential element in regional information management, we do acknowledge that it must complement and not replace services of primary providers. Coordination between the primary and secondary providers will assure cooperative and effective service to the region. The comparison can serve as a starting point from which the Council could pursue constructive coordination between all interested parties. Such a development would compliment the developing Regional Framework.

Section 9. Key personnel

Section 1 of this document identifies the three extant contractors that manage most online inseason and historical fishery data. Depending upon a mutual agreement developed between the Council, BPA, and other interested parties, any or all of these contractors could play some role in the information infrastructure involved in this project. Both UW and PSMFC currently have experienced and capable UNIX administrators and database administrators and similar computer services (though database management software are distinct).

Objectives 1 (Providing data sets) and 3 (Public Internet Interface) have been successfully prototyped by the University of Washington and Battelle Pacific Northwest Laboratory. That success was due largely to the ability of the database administrator and web programmer to constructively interact with peers within the primary information services and to quickly respond to requested changes in the evolving service. These characteristics are essential in future efforts to develop online information services that include a broad constituency.

Objective 2 (Monitoring and Evaluation Interfaces) will require the same constructive and collegial exercise of technical skills. Coordination with the Council and other entities may require appointment of additional staff to coordinate the development of service requirements.

Recognizing the pioneering role that the University of Washington has played in guiding Internet application development, The following resumes are provided as examples of the professional qualifications desirable for the Principal Investigator, database administrator, and web programmer/analyst.

Curriculum Vitae

James J. Anderson (Principal Investigator)

Associate Professor (WOT)

Fisheries Research Institute and Center for Quantitative Science in Forestry, Fisheries and Wildlife
College of Ocean and Fisheries Sciences

Office Address

Columbia Basin Research
Puget Sound Plaza
1325 - 4th Ave., Suite 1820
Seattle, WA 98101-2509
Phone: 206-543-4772

University Address

Fisheries Research Institute
Box 358218
Seattle, WA 98195
Phone: 206-616-9174

FAX: 206-616-7452

e-mail: jim@fish.washington.edu

<http://www.cqs.washington.edu>

Teaching Activities:

Graduate course in modeling organism dynamics (QSCI 551)

Graduate course in Ecosystem models (QSCI 550)

Students Receiving Degrees: Three in M.S. Fisheries, Two in M.S. Quantitative Ecology & Resource Management, and Two in Ph.D. Quantitative Ecology & Resource Management.

Current Research Projects:

Bonneville Power Administration (Funding level: \$6 million): Developing computer models for management of Columbia River hydroelectric and fisheries agencies.

U.S. Army Corps of Engineers (Funding level: \$600,000): Developing analysis and computer models for the impact of gas bubble disease on migrating salmon.

National Marine Fisheries Service (Funding level: \$300,000):

- 1) Studying mortality processes of juvenile salmon in tributaries
- 2) Developing a multi-species multi-regional salmon harvest model

Honors and Awards:

- 1) Research Faculty Fellowship, College of Ocean and Fishery Sciences 1985, 1989.

- 2) Special Recognition for participation in the U. S. Fish and Wildlife Service Fish Passageways and Division Structures course in 1990.
- 3) Nomination for Computerworld Smithsonian Awards in programming for the CRiSP computer model College of Ocean and Fishery Sciences Distinguished Research Award, 1996.

Professional Activities: Consulting; Expert Testimony on Fish Migration and Dam Passage; Guest Speaker

There is a total of 47 Publications. The 1997 Publications include:

Anderson, J.J. (in press) Decadal Climate Cycles and Declining Columbia River Salmon. Proceedings of the sustainable Fisheries Conference, Victoria B.C., Canada, 1996. Eric Knudsen, Editor. Special publication of the American Fisheries Society.

Anderson, J.J. 1997. Decadal Scale Climate Pattern and Salmon Survival: Indicators, Interactions and Implications, Estuarine and Ocean Survival of Northwest Pacific Salmon Workshop NMFS 1997.

Beer, W.N. and J.J. Anderson. 1997. Modeling the Growth of Salmonid Embryos. Journal of Theoretical Biology. 189(3) 297-306.

Zabel, R.W. and J.J. Anderson. 1997. A Model of the Travel Time of Migrating Juvenile Salmon, with an Application to Snake River Spring Chinook. North American Journal of Fisheries Management. 17:93-100.

Judith E. Cress
1705 Belmont Ave., #807
Seattle, WA 98122
Home phone: (206) 328-0399
Work phone: (206) 685-7972

Experience:

Research Consultant/Data Manager
 Columbia Basin Research, University of Washington (1992-Present)

Coordinate and design Columbia River DART, a real time data warehouse for salmon research on the Wide World Web. Designed and built internal data design and automated access loading system. Coordinate with external organizations for data resources. Provide automated data support for Technical Management Team. Provide data support on salmon research projects for both in-house projects and external organizations.

Program Manager - PIT Tag Information System
 Pacific States Marine Fisheries Commission (1990-1992)

Designed and implemented PTAGIS management information system under Bonneville Power Administration Contract. Managed all PIT Tag data acquisition sites at Columbia

and Snake River Dams. Coordinated with ten man Inter-governmental working committee. Managed engineering and programming support staff and budgetary areas. Provided PTAGIS training to Federal, State and Tribal personnel.

Database Analyst

Automated Data Processing (1989-1990)

Designed and built automobile parts tracking system for Nissan auto parts. Worked in advanced research department.

Supervisor/ Database System Analyst

General Electric Government Services (1983-1989)

NASA-Ames Research Center, Sunnyvale, CA

Supervised software support department. Designed and implemented more than two dozen database management systems for life science research for Space Shuttle Life Science missions. Served as Ames Research Site Representative on Space Station Information System at Kennedy Space Center and Johnson Space Center. Member ground support team, Space Shuttle Discovery (1985).

Education:

B.S. Information System Management, University of San Francisco, 1985

Computer Science and Engineering, U.C. Berkeley 1983-1984

Project Management Certification, National Aeronautic and Space Administration, 1987

Project Management Training, General Electric Government Services, 1987

Susannah Lea Iltis

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EDUCATION

Master of Library Science (1995) Graduate School of Library and Information Science (accredited), University of Washington, Seattle WA.

Bachelor of Arts (1990) Pomona College, Claremont CA — Concentration: English Literature.

PROFESSIONAL EXPERIENCE

Public Information Specialist (1994-present, 1.5 years graduate student) Columbia Basin Research (CBR), School of Fisheries, University of Washington, Seattle, WA.

- Ø Web coordination - responsible for managing and maintaining the CBR web site (averaging 8000-10,000 hits per week) which includes a real-time database, computer models, analysis tools, literature reference database, and research publications. URL: www.cqs.washington.edu
 - ◆ plan and implement web site redesign (July 1997), implement web site search engine, validate web site hypertext links on regular basis, design and create new web pages
 - ◆ prepare and convert word processing documents for dissemination on the WWW
 - ◆ search, analyze, and evaluate quality of information on WWW for selective dissemination
 - ◆ write online documentation and perform technical editing
 - ◆ answer requests for information on variety of subjects
- Ø Document coordination - responsible for the creation, design, and augmentation of the CBR Literature Database for the research project using the DBMS Ingres and WAIS (Wide Area Information System) -- currently over 1700 records on salmon, fisheries, oceanography, animal behavior, modeling, and statistics. URL: www.cqs.washington.edu/crisp/lit/
 - ◆ develop conceptual schema and design and test record formats
 - ◆ locate, acquire, and catalog documents
 - ◆ design, implement and maintain full-text, web accessible database using WAIS

OTHER WORK EXPERIENCE

Book Sales Associate (1990-present) University Bookstore, Bellevue, WA.

- ◆ perform excellent customer service
- ◆ assess, research and fill customer's information needs
- ◆ pinpoint and solve difficult customer service problems with orders and stock

ORULS (Oregon Regional Union List of Serials) Assistant (1986-1990 part-time)

Oregon State Library, Salem, OR.

- ◆ search and evaluate OCLC bibliographic records for comparison to the microfiche records
- ◆ convert microfiche records to OCLC
- ◆ union list serial holdings (160 participant libraries)

Manuscript Reader and Publicity Intern (1990-1991) Seal Press, Seattle, WA.

- ◆ manuscript reader: read and evaluate submitted manuscripts, prepare

- recommendation reports and answer manuscript submission inquiries
 - ♦ publicity: keep publicity review files current and assemble promotional kits and mailings
-

COMPUTER / INTERNET RELATED EXPERIENCE

Operating Systems: UNIX, Windows 95, Windows NT

DBMS / Databases: Ingres, BIP Plus, SilverPlatter databases, OCLC FirstSearch

Internet: WWW, WAIS, HTML, Netscape, Internet Explorer, gopher, telnet, ftp

Software: OpenWindows, MS Word, MS PowerPoint, MS Project, Adobe FrameMaker, Adobe Exchange, Quadralay WebWorks Publisher, Xview, Xpaint, Excite EWS, HyperNews, MapEdit, Wusage

Section 10. Information/technology transfer

See all of the above!